1/330 of a *horse-power!*" Our author would surely have thought twice before writing "the *distance* from London to York is 200 *miles per hour.*" But this, to which we invite his careful attention, would have involved no greater blunder.

"If the bodies are elastic . . . , the *whole* of the *energy* of the striking body is expended in producing *motion* in the body *struck.*" After this it will not, perhaps, surprise the reader to find that we are furnished with a calculation of "the total *heat from absolute zero* resident in exploded powder, at an atmospheric temperature of 50°, or 510° absolute."

The work may be made, even as a whole, thoroughly useful to those habituated to the persistent inaccuracies of the "vernacular":—but, to effect this, it must be carefully purged of statements analogous to the three last-made quotations. P. G. T.

A FIELD NATURALIST IN EASTERN BENGAL

Letters on Sport in Eastern Bengal. By Frank B. Simson, Bengal Civil Service, retired. (London: R. H. Porter, 1886.)

THIS book is essentially a record of sporting scenes, and the author has ostensibly written it for the purpose of giving instruction in the art of shooting and hunting wild birds and beasts of various kinds, from quail and snipe to tigers and rhinoceroses. Yet it contains so many good observations on the haunts and habits of wild animals, and the author shows himself so capable a field naturalist, that a reader who looks for zoological information will probably be disappointed at not finding more novelty. The scene of Mr. Simson's principal adventures, Eastern Bengal, a vast plain traversed by mighty rivers, a country of rice fields and cane brakes, and great grass jungles, of "bheels," or marshes, and "churs," or temporary islands and sand-banks in rivers, has by no means been rendered too familiar by description. Fertile and peaceable, with never-failing rains and magnificent water communication, it furnishes few sensational paragraphs for newspaper correspondents or other manufacturers of periodical literature. The region is as little known to Anglo-Indians in general as the Highlands of Central India, so vividly described by Forsyth, or the wild Mysore country, of which the elephants, tigers, and other wild beasts found an historian in Sanderson. Why is it that the additions to our zoological knowledge made by Mr. Simson are so much less important than those made by Sanderson and Forsyth?

The explanation is probably twofold, if not threefold. All the three writers named were enthusiastic sportsmen and good observers, but Forsyth and Sanderson related events of more recent date, the details of which were naturally more vivid, whilst the present work is a series of reminiscences, written out long after the incidents described took place. The avocations of the different writers, too, were very dissimilar. Those of the two authors first named led them to pass weeks and months amongst the haunts of wild animals, whilst Mr. Simson, a Bengal civilian, could only spend an occasional holiday at a distance from his office, or avail himself of a few hours at a time during the cold season's tour. Another reason, perhaps of even more importance, is the great difference in the nature of the country, and the different system of hunting rendered necessary. The great grasses of the Gangetic plain, even when reduced to patches by the fires of the spring, conceal the movements of their inhabitants, from rhinoceroses and buffaloes downwards, far more than do the jungles of Central and Southern India, especially after their much less luxuriant grasses have been burnt. The process of beating out a patch of thick grass 10 to 20 feet high with a line of elephants differs widely in the opportunities afforded for observation, from the tracking, chiefly on foot, of the animal sought after, through the burnt glades of the Satpura hills or the comparatively thin undergrowth of the Sahyadri forests.

It must not be supposed that Mr. Simson's work contains no novel observations. A very large proportion of our acquaintance with the habits of animals, especially of the larger Mammalia, is due to sportsmen, but the value of their observations varies. A few sportsmen are deliberately untruthful,—these are easily detected; but many more are unqualified for accurate observation. There is no better test of a writer's truthfulness and capacity than his snake stories. In America it is commonly said that there is no subject on which ordinary mortals are so prone to what may euphemistically be termed "romancing." Indian experience corresponds to American, and whatever may be the deficiencies of the Bengali peasant, no one ever credited him with want of imaginative power. The Europeans in India, as a rule, know nothing about snakes. In the work under review, two of the best letters (the whole is written in epistolary form) deal with snakes, and the account of the poisonous species, all of which are correctly named and described, is excellent. To have picked out the grains of truth, and disregarded the chaff, shows judicial acumen worthy of one who has, in the administration of the law, had much experience of conflicting evidence. One of the most interesting facts mentioned is the use made of cobra venom in poisoning arrows used for the destruction of wild animals.

Another interesting observation may be noted: the shooting of a tiger "whose paunch was crammed full of grasshoppers or locusts." Hitherto, although tigers were not thought to be very particular, they were supposed to draw a line at frogs, and were not suspected of condescending to devour insects.

The plates are good on the whole, the elephants excellent, and the lithograph entitled "A scrimmage with a tiger," is one of the best representations of the animals and men depicted to be found in any Indian sporting work. But the pigs—with one exception, in which the animal looks as if he had been shaved—are far too shaggy, and resemble the European boar, *Sus scrofa* rather than the Indian *S. cristatus.* W. T. B.

THE MEASURE OF THE METRE

La Mésure du Mètre. By W. de Fonvielle. (Paris: Hachette, 1886.)

M. DE FONVIELLE'S little volume is truly national. From one end to the other it rings with applause for those brave men of France who, in 1792 and the

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following years, under extraordinary difficulties—political, social, and geographical—determined the measure of the arc of the meridian from Dunkirk to Barcelona; from the 1/10,000,000th part of which arc the measure of the metre was then derived.

The author in stirring language recounts the dangers and disappointments of the scientific men engaged in this work during the Revolution—Méchain, Delambre, Berthemie, Biot, Arago, Lenoir, and Lavoisier. He endeavours to awaken a warm and genuine admiration for their labours, and to show that the love of science is in some way natural to France. In pathetic words he recounts the dangers in the field: Méchain's work in Spain, his troubles at home, his recall, and return to Spain; his fears that the great measurement might never be accomplished; and at last the sad end—Méchain's death in 1807 at Plana, a victim to yellow fever. Then follows the appointment of Biot and Arago, and the account of their doubts and difficulties in completing the measurements, of the capture and imprisonment of Arago and Berthemie, of their detention in Algiers, and of their ultimate ransom and release.

M. de Fonvielle traces the development of the new system of weights and measures from the proposal of Buffon in 1790 to take as a unit the length of the seconds pendulum, to the report of the completion of the measurement of the metre in 1809. He refers to the invitation given by France in 1790 to our country, to join in an international effort to adopt one weight and one measure for all nations. This invitation, as experience has shown, ought not to have been declined, but even now, owing to the reluctance of English-speaking nations to abandon their traditional units, a similar proposal might possibly not be warmly received.

M. de Fonvielle reminds his readers that the French metric system must not be altogether regarded as a French innovation, for the Chinese long ago adopted a decimal system. It is to Shun, the sage, when Regent of the Chinese Empire, B.C. 2287, that China owes its decimal system, based on a so-called natural constant, the length of the musical standard lü, or bamboo pitch-pipe.

Of course this little volume is intended for popular reading, particularly in France. For the true account of the circumstances and results of the measurement of the arc of the meridian which passes through Paris, we must go to the "Mémoires" published by Méchain and Delambre in 1806, and to the observations of Biot and Arago issued in 1821.

OUR BOOK SHELF

Histoire Générale des Races Humaines. Introduction à l'Étude des Races Humaines—Questions Générales. Par A. de Quatrefages, Membre de l'Institut. (Paris: A. Hennuyer, 1887.)

PROF. DE QUATREFAGES and M. E. T. Hamy propose to edit a general history of the human race, and the present volume, by Prof. de Quatrefages, is intended for an introduction to a series of monographs by various authors. The dark races will be described by M. E. T. Hamy; the yellow races by M. J. Montana; and the red races by M. Lucien Biart. These volumes are in course of publication, and the first volume of the series, on the Aztecs, by M. L. Bert, has already appeared. There will be a volume on the Mongols, by M. J. Deniker, and one on the Foulahs, by Dr. Tautain.

In the present volume the general questions of ethnology are treated of, and the subject of the classification of the human race is passed in review. With that charming style which characterises the writings of this author, and which has for long made him one of the most popular writers on scientific subjects in France, he here gives a *précis* of the chief works treating on ethnology, and decides that the human race must not be placed in the same category with the animal race, because it exhibits the presence of two additional phenomena, those of morality and religion.

On the question of the unity of the human species, too often one of mere words, the *pros* and *cons* are placed before the reader in a tabular form. In the chapter on the first appearance of man, the various transformistic theories are passed in review, and the views of Darwin, Huxley, Vogt, and Haeckel are alluded to; but the author for himself believes that any certain knowledge on this point is beyond our actual powers. In other chapters, the antiquity and geographical origin of the race are treated of, as well as the subject of the peopling of the globe and the acclimatisation of the species. Primitive man is regarded as of distinct ethnic types, and from these the races took their rise. Lastly, the physical, the intellectual, and the moral and religious characters of the races are discussed in some detail. The work is supplied with numerous and excellent illustrations; it is printed in clear type on royal octavo paper, and forms a handsome volume of nearly 300 pages.

Grundzüge einer Theorie der kosmischen Atmosphären mit Berücksichtigung der irdischen Atmosphäre. Von Wilhelm Schlemüller. (Prague.)

IN this pamphlet the author introduces a modification into the ordinarily accepted dynamical theory of gases by assuming that the molecules of a gas at uniform temperature are all affected with absolutely the same linear velocity as regards magnitude, instead of the temperature being dependent on the mean or average velocity. This of course greatly simplifies the labour of deducing the fundamental relations between pressure, density, temperature, and the potential of external forces; and he claims to be able to deduce the relation, which for the terrestrial atmosphere gives Bessel's refractions to 90° (*sic*) zenith distance; agreeing with the formulæ found by Bauernfeind in 1862-64. We may remark that the convertible equations are reproduced in some cases with almost wearisome frequency, and that Joule is twice called Jonle.

Manual of Physical Geography of Australia. By H. Beresford de la Poer Wall, M.A. (Melbourne: Robertson.)

THIS little manual is written for Australian schools, and may be accepted as a fair and trustworthy account of the physical geography of Australia. For an exhaustive treatment of the subject the material is still wanting for a large section of the continent; on others, again, there is abundance of material, and of these Mr. Wall has made creditable use. It is a pity the book should be burdened with such terrible lists of names as those on pp. 9 and 10: the author would have done much better had he shown the relations of the leading capes to the general relief of the land.

An Intermediate Physical and Descriptive Geography, abridged from the Physical, Historical, and Descriptive Geography of the late Keith Johnston. (London: Stanford, 1886.)

THE late Keith Johnston's larger geography is on the whole the best general text-book of the subject in English. The present abridgment for middle-classes in schools seems to us judiciously done.

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